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ON THE COLOUR AND DISPOSITION OF MARKINGS IN THE DOMESTIC CAT.

By G. T. ROPE.

THE following fact with regard to the markings of the Domestic Cat strikes me as being rather curious, and is I think worthy of notice. I have never come across any allusion to it in any work treating of this animal, although it may, notwithstanding, have been pointed out before. All Cats of the "harmless necessary" kind, including the long-haired varieties and the Manx Cat, are I believe universally supposed to be descended from one species, and one only, although what that species is has never been satisfactorily determined.

Broadly speaking, there are two distinct patterns, if I may so call them, to which the markings of all coloured cats may be referred, for, with the exception of white ones, all may be said to be tabby; that is, they are marked with two shades of colour, a light and a dark one, disposed according to one of the two patterns I will attempt to describe, the markings of the face, and to some extent that of the chest and legs, being common to both patterns. Great as is the variety of colour among Domestic Cats, the markings of each individual will always be found to be disposed, as mentioned above, after one of these two distinct plans, which, though often somewhat modified and varied in different animals, are never so much so but that the general arrangement is at once apparent. Black cats form no exception

to this rule, but all I believe belong to one or the other of these patterns, for though when full grown the stripes are sometimes not perceived without difficulty, yet in most blacks they are discernable in certain lights. In black kittens they are often easily to be seen, but, as in the case of the cubs of the Lion, they become fainter as the animal grows older, but do not often, I believe, wholly disappear, as do the leonine stripes; the two shades (like those seen in the fur of the so-called black variety of the Leopard) approach each other so nearly in depth as to be not easily distinguished.

Pattern 1, which approaches nearest to that seen on the fur of the Wild Cat, and is often to be found in nearly the same colours, is I believe sometimes called "tiger-striped" to distinguish it from the other kind of tabby, though, excepting in the vertical direction of the stripes on the sides, it has in reality not much resemblance to a Tiger's markings, but approaches nearer, I think, to those of the Serval. The lighter of the two tints forms the ground colour, which is adorned with darker markings, consisting of a dorsal line, often split into three, in which case the two outer ones are slightly broken into spots, which form a sort of starting-point for the narrow stripes which branch out nearly at right angles to the spine, partaking in some cats more of the character of spots than stripes. The dorsal line does not extend unbroken further forward than to a point between the shoulder-blades, sometimes not so far, being always most perfect over the loins; it is in some cases rather obscure by reason of the ground colour being (as is the case with most mammals) darkest on the top of the back, without, in the present case, a corresponding variation in the depth of the markings, in consequence of which the two tints along the spine are often nearly the same. The shoulders are covered with narrow wavy lines, the arrangement of which it is difficult to describe, but the curves of which harmonise in a beautiful manner with each other and those next to them. The stripes on the hind quarters are directed forwards and downwards, excepting those at the extreme posterior edge of the hams, the direction of which is backwards and downwards. Those on the legs are wider and of a bolder character than the rest, and in both patterns are principally confined to the upper part of the limbs.

Pattern 2.—In this arrangement of hues, which is the commoner of the two, the relation of the two shades to each other is

reversed, the general rule here being, for the greater part of the surface of the fur, light markings on a darker ground, disposed, with the exception of those on the face, legs, and chest, in a manner totally different to that already described. There is, so far as I am aware, no distinctive name for this arrangement of colours, but it might for want of a better, and to distinguish it from the other kind of tabby, be called the "ring-tabby," from the invariable presence of a large ring of the lighter of the two shades, more or less perfect, situated on the side of the body, a little in front of the flank, the dark space enclosed by it containing in most cases yet another light mark near the centre, varying in form and distinctness in different individuals. This ring is partly encircled above and behind by another light-coloured mark, somewhat in the manner of the rings surrounding the bull's-eye of a target. This mark is very wide behind, becoming gradually narrower as it extends forwards, which is only for a few inches, the upper edge being often jagged; its shape serves to harmonize the curve of the upper part of the ring with the two straight, light-coloured lines which invariably extend along the back, over the loins, one on each side of the spine, from the root of the tail to a point between the shoulder-blades, where they suddenly diverge, and again nearly meeting run parallel to each other till they become merged in the light tint of the nape of the neck, which may here be said to form the ground colour; for although the greater part of the body is dark with light markings, the head and neck, chest, and lower half of the limbs, would be better described as having a light ground with dark markings, which scarcely differ from those in pattern 1. The shoulder-markings are often rather obscure, and it is almost impossible to give a good idea of them in writing, but there is a general tendency to follow the direction of the scapulars, and at the same time to harmonize and fit in, so to speak, with the rest of the markings in a beautiful but very subtle manner.

The lines running along the back of the neck in cats of both patterns are five in number (two or more of them often running into each other for a part of their length), the two outer lines in the case of the ring-tabby being continued backwards in a sweeping curve, so as to lead gradually into the dark bands which traverse the chest, enclosing a large space at the side of the head and neck, almost without markings; this is bounded below by a broad

dark patch from which spring the stripes of the chest, only one of which is usually entire. As before stated, these markings are slightly varied and modified in different animals, and no two cats will be found exactly alike; some of the markings in one example will be found to be only faintly or imperfectly indicated, or perhaps entirely suppressed; while in another specimen the corresponding markings will be perfectly developed, and others which were perfect in the first example will be somewhat altered in form, or nearly wanting. The ring, however modified, I have never found entirely absent, nor the two broad stripes over the loins, though they may nevertheless be so occasionally.

From the foregoing very imperfect description of the two distinct manners in which the markings of cats are disposed it will be observed that it is the back and sides which differ most. The most characteristic points which distinguish pattern 1, or the tiger-striped variety, consist in the fact of the light tint forming the ground colour, and the dark the spots and stripes, and in the vertical direction of the side-stripes; that of pattern 2, or the ring-tabby, in the relation of the two tints to each other being reversed, and the dark consequently forming the ground, in the presence of the ring on the side, and of the two broad light stripes on the back, leaving a dark space between. Other well-marked distinctions might be enumerated, but the above will, I think, be sufficient for the present purpose. In the case of cats marked with white, however small the coloured patches may be, the markings upon them will be found to correspond exactly with those of whole-coloured animals, provided, of course, that the coloured parts are large enough to show the pattern, the effect of the white being precisely that of a piece of paper with holes cut in it of various shapes, placed over the animal, through which bits of the pattern are visible. The distribution of white in cats is much the same as in dogs (more especially mongrels); where only a very minute portion of white occurs, it is most likely to be found on the chest; if a rather larger quantity, on the chest and feet; where there is yet more white, more or less of the muzzle is marked with it, accompanied perhaps by a white collar; and so on till we come to white cats with a few dark—that is, tabby—spots. Sandy or red tabby cats are to be found marked according to both patterns.

The distribution of colour in tortoiseshell and white cats

is very singular; instead of the yellow and black forming the two tints for the ground colour and stripes respectively (which arrangement would be very beautiful if it could be produced), the pattern, whichever it may happen to be, is most distinctly seen in the sandy or yellow parts, which are of the same two shades as in ordinary sandy cats—*viz.*, buff and dull orange, interrupted here and there by white. Whether the pattern of the black is a continuation of, and corresponds with, that of the sandy parts, I have never been able to determine; for in many specimens the colours are so mixed up, and disposed in such small blotches, that it is a difficult matter to decide this point. I think it probable, however, that there is but one pattern throughout.

Since hybrids have undoubtedly been produced with the Wild Cat in a state of captivity (see Zool. 1873, p. 3575), is it not within the bounds of possibility that even in a wild state such a thing may occasionally have happened, when the Wild Cat was comparatively common, and thus have given rise to the tiger-striped race? But even then it seems strange that, after countless generations, these two distinct types should continue to be perpetuated, especially as there has never been any attempt worth mentioning at selection as to colour and markings, but all have been allowed to mix indiscriminately, with scarcely any restraint. In Mr. Harvie Brown's interesting account of the rarer animals of Scotland, it is deplorable to read of the gradual extinction of the Wild Cat and the Marten, and their continued persecution by gamekeepers; but as he states that the large deer-forests in the North afford a refuge to a few, and that at least one large landed proprietor affords them protection (would there were more), it may be hoped that the time when this interesting animal can only be considered as a thing of the past is not yet quite at hand.

EXPLANATION OF PLATE I.

Fig. 1. Tiger-striped Tabby, or Pattern 1.
Figs. 2 & 3. Ring-Tabby, or Pattern 2.

NOTES AND OBSERVATIONS ON BRITISH
STALK-EYED CRUSTACEA.

BY JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 307.)

Genus *Pisa*, Leach.

Perhaps no other genus of the British Podophthalmia is of such interest, or presents such remarkable features in its life-history, as the genus *Pisa*. It comprises two very characteristic species hitherto known from our seas, but is more fully represented in warmer latitudes, where, in all probability, numbers of still undescribed species exist. In the Adriatic Sea alone, according to Prof. Luigi Stalio,* six species are described.

The general form of the carapace of *Pisa* is triangular, the anterior angle being finished by a stout bifid rostrum, varying slightly in the two species. Its appearance is spinous, and the legs are shorter in comparison with the body than those of the other "Spider Crabs." The antennæ are about as long as the rostrum, the second joint being slender. The external pedipalps are broad, and the abdomen is seven-jointed in both sexes. As the specific characteristics are, although so closely allied, yet so distinct, it is perhaps more advantageous to simply sketch the generic features rather than to attempt details which are subject to variation. For instance, the club-shaped hairs of the antennæ alluded to by Bell can scarcely be said to refer equally to both species, seeing that the general covering of the carapace is so extremely dissimilar in the two; and, in fact, his two figures† represent antennæ of considerably different structure as to this hairy covering.

Pisa tetraodon, Leach.

The carapace of this species is about an inch and a half long in the adult, although specimens occasionally occur in which this length is exceeded. The greatest breadth is about an inch. Although roughly triangular, its form is much more rounded than

* 'Atti del Reale Instituto Veneto,' Tom. iii., ser. 5, p. 375.

† 'British Stalk-eyed Crustacea,' pp. 22 and 27.

that of the following species; its lateral margin is armed with stout spines, of which two large ones protect the eye-stalks, and two others, still larger, form the bifid rostrum.

The carapace is ornamented with spines and tubercles, interspersed with tufts of a remarkable hair-like process, which we will allude to more fully in the description of *Pisa Gibbsii*. These tufts afford lodgment to the spores of marine life, so that it is not unusual to find specimens of *P. tetraodon* to which are attached zoophytes, such as *Plumularia falcata*, *Aleyonium digitatum*, and others; also sponges, such as *Halichondria panicea*, but as the following species is much more liable to this remarkable embellishment, we will describe individual specimens when dealing with *P. Gibbsii*.

The legs of *Pisa tetraodon* are stout and armed with hairy tubercles. They taper off after the first joint and are furnished with extremely sharp curved claws, which are capable of being clenched back upon the next joint, so that the hold of the animal is rendered very secure; in fact, its habits in this respect correspond to those of many parasites which live on the hair of animals, and require a firm mode of attachment. This similarity of development is of considerable interest, and when we consider that the habits of this genus are extremely retiring and sedentary, this means of a secure anchorage is accounted for.

The anterior pair of legs are as usual developed, in the male, into a formidable pair of forceps. Bell observes that these legs do not attain to this size until the animal is adult, so that males which are nearly full grown may have them equal in size to the anterior pair of the female. In fact, specimens are sometimes met with which have these legs fully developed, and yet are of smaller size than others whose corresponding limbs are quite immature.

The abdominal somites are seven in number, narrow in the males, but so broad in the female as to be almost circular, and thus capable of affording protection to a large mass of ova. The somites are divided vertically by a broad ridge or keel, with a small tubercle on each somite.

The antennæ in this species are studded with clubbed hairs; the external pedipalps are broad, and the eyes, which are very little broader than their peduncle, are capable of being turned back for protection into their orbit.

The colour of *P. tetraodon* varies considerably, some that we obtained from the Sussex coast being of a dirty brown and liable to obscuration by the growth of Algae, &c., whilst amongst those which we obtained from the Channel Islands were many of a rich reddish brown tint, remarkably clean and fresh-looking. As we received these specimens alive, we know the colour was not caused by any exposure of the shell to undue heat, but was perfectly natural. From further observations we are inclined to believe that specimens vary considerably in colour, according to the geological character of the district, which affects to some extent not only the nature of the sea-bed which forms their home, but also the marine fauna and flora by which they are surrounded.

The ova of this species are very numerous and of a rich orange colour, attached in the usual way to the swimmerets of the female, and covered by the broad segments of the abdomen. They are exuded during April and May, and become a deep red, approaching to black as zoeæ matures.

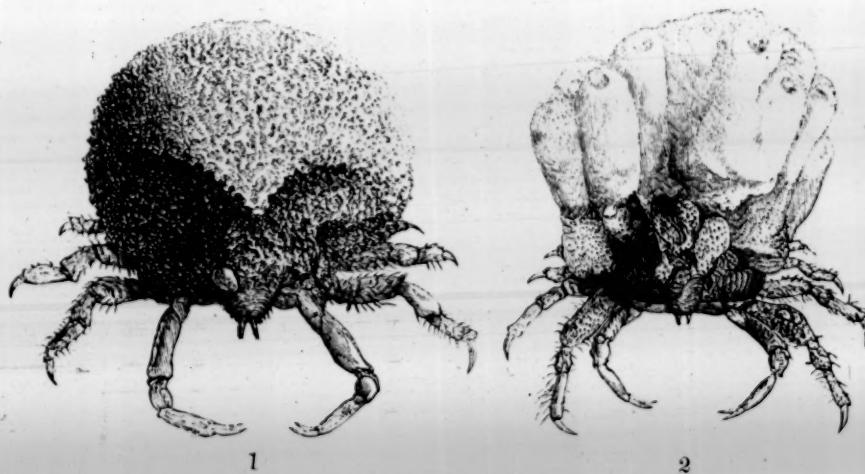
Pisa tetraodon is considered by Bell as "not common"; but although it may not be widely distributed it is certainly very abundant where it occurs, and we have obtained it from several localities in tolerable numbers; as, for instance, the Nore, the Channel (Sussex coast), and the Channel Islands. Dr. Leach mentions "the Isle of Wight, Teignmouth, and Brighton," and Bell "the Dorsetshire coast and Bognor." M. Milne-Edwards says it is very common on the shores of France and England. Mr. Lovett found large numbers of bleached and broken specimens on the beach at Shoreham in May, 1880, and quantities were thrown up in the same locality during the great storm of January, 1881.

Pisa Gibbsii, Leach.

Although this species resembles the former in many of its general features, it differs from it widely in others. The form of the carapace is more flattened, also less rounded laterally; its margin is also less spinous, and its rostrum not so divergent at the extremity, though somewhat longer than that of *P. tetraodon*.

Perhaps, however, its chief peculiarity, and at the same time one of the most remarkable features in the whole of the *Decapoda*, is the existence in *Pisa Gibbsii* of the dense covering of "hair"

which it possesses. The direct use of this peculiar covering appears somewhat doubtful, but its suitability to form a nidus for the growth of forms which tend to conceal the animal probably afford the true explanation. The "hairs" when examined microscopically consist apparently of a fibrous mass distributed very equally over the carapace and of an equal height. Upon the tubercles of the carapace, however, there are tufts of hair of a different structure; these latter are not fibrous, and are, moreover, club-shaped and curved, resembling in form the antennæ of the lepidopterous insect, *Zygæna filipendula*. If a vertical section be taken through the carapace, the hairy covering will appear like a multitude of pillars supporting a platform; this platform is formed



SPECIMENS OF *PISA GIBBSII* WITH SPONGES ATTACHED.
(See p. 363.)

by the ends of the fibres becoming matted together with objects with which they come in contact and to which they readily adhere. Amongst those on the stage of our microscope were many grains of sand and large quantities of spiculæ, &c. All this accumulation affords an excellent lodgment for the spores of various marine growths, and we shall close our account of this species with a description of a few of the most remarkable of these in Mr. Carrington's collection. The hair-like processes on the sternum are on a whitish ground, which gives a curious effect, the hairs being brown. When dry they are easily broken away and show

little or no attachment to the surface of the exoskeleton of the animal.

The generic peculiarity already alluded to—namely, its sluggish habits—are well illustrated in this species; and it is partly owing to the sedentary habits of the female in particular that the spores, &c., of marine animals are enabled to become planted in this villous covering. Mr. Carrington's assistant, Edward Matthews, recently made some observations upon some specimens of this species which were living in one of the tanks at the Royal Aquarium, Westminster, and he noticed that one remained perfectly motionless between two little ledges of rock for two or three days. Thinking it was dead, he was about to remove it, but, finding it to be perfectly lively and well, he returned it to the water, whereupon it took up its former position, in which it was seen altogether for upwards of a week. This is a striking instance of the stationary habits of some of the Crustacea, and it is therefore not so much a matter of surprise that they become, in the way they do, so assimilated in appearance to their surroundings.

Many of the specimens of this species that have come before our notice have been so completely buried in masses of sponge and *Aleyonium* that it seems more than probable that their protective covering ultimately destroys them. Thus that which preserves their life by protecting them from the attacks of natural enemies, who evidently do not recognise them under their spongy covering, eventually causes their death. In one specimen which we saw, only one leg and the abdominal segments were left free, and the eyes were just able to move in a deep hole in the sponge, which proved to be of the genus *Ophlitaspongia*.

In course of time, no doubt, *Pisa Gibbsii* thus becomes the nucleus of a mass of silicious spiculæ which envelop and preserve the form of the crab. Were there any representatives of this peculiar type existing in the cretaceous seas, doubtless we should meet with their silicified tests in the flints of that formation. We are not aware of the existence of any allied form having hitherto been found in any rocks. We are, however, enabled to form some sort of idea as to the manner in which certain bodies may have become enveloped in masses of silicious spiculæ, and ultimately to have become the nucleus of a flint nodule.

Pisa Gibbsii was, according to Dr. Leach, discovered by Gibbs, who was employed as a collector by Colonel Montagu. It is apparently not rare on the south coast in depths of from five to twenty fathoms, and has been recorded from Devon, Cornwall, Brighton, and Hastings. Prof. Milne-Edwards gives its localities as the shores of France and England. We have obtained it principally from mid-channel, whence it was obtained by dredging. We also obtained some from the Channel Islands, amongst which were two beautiful varieties, both males, the colour of which was a rich carmine, the brightness of which did not entirely disappear at death.

The usual colour of this species is a russet-brown, varying occasionally in shade. It is stated to be with ova in December.

The following is a short description of six specimens of *Pisa Gibbsii* in Mr. Carrington's cabinet:—

No. 1.—This specimen is figured at p. 361, and is covered with a rounded growth of the sponge *Dysidea fragilis*. This sponge had almost completely enveloped the animal, and illustrates our previous observation as to the ultimate destruction of the enclosed crustacean, as there is every probability that this identical specimen would have at length become helplessly covered by the external growth. This sponge is extremely brittle when dry, and comparatively so when living, being composed to a large extent of sand.

No. 2.—This specimen, also figured at p. 361, is the most beautiful of the series. It carries on its carapace a rare sponge, *Isodictya*, which is attached by its base across the carapace from one side to the other, as shown in the figure. It rises to a height of about an inch and a half, and is about half an inch thick. Its colour is a most delicate glossy white, and when the crab reached us alive, with its burden in a fresh condition, it was a most lovely object, the contrast of colour having a most striking effect.

No. 3.—This specimen carries a large sponge, *Desmacidon rotalis*, which is one of our rare forms. This sponge is massive, sessile, and uneven or ragged, and of a dark warm-brown colour; it completely covers the upper carapace, and rises to a height of an inch and a half from its base. The eye-stalks of the crab are free, as their motion prevents the growth of the sponge upon them.

No. 4.—This crab is quite obscured by a very fine growth of sponge, *Isodictya dichotoma*, which rises and spreads from the carapace of the animal so as to completely shield it from view. Interspersed with this sponge there is a growth of the zoophyte, *Plumularia falcata*, the fronds of which are about two inches in length. Altogether this specimen is a fine example of protection obtained by resemblance to the ordinary rock-growth of the seabed, and it is only necessary for the crab to tuck in its legs and remain still to appear like the surrounding objects in its neighbourhood.

No. 5.—This example consists of an irregular growth of a species of *Isodictya*, intermingled with some fine tufts of *Sertularia argentea*. In this specimen there is a pebble of limestone half an inch in diameter embedded in the sponge.

No. 6.—This animal is a highly interesting specimen, owing to the number of parasitic growths which have secured a lodgment upon it. The whole of the upper carapace is covered with a dense mass of sponge, *Halichondria panicea*, which extends in an elongated branch for nearly an inch beyond the rostrum; its height is, however, only about half an inch. Over about two-thirds of the surface of this sponge is growing a second, *Dysidea fragilis*, its arenaceous net-work forming a beautiful object. At the termination of this mass there is a tuft of *Sertularia argentea*, and upon the right lateral margin of the carapace, immediately beneath the overhanging edges of the two sponges, is an *Aleyonium digitatum*, about half an inch long and three-eighths of an inch broad; beside this, again, is a tube of *Serpula communis*. Altogether it is a matter for surprise that an animal so obstructed and weighted is able to perform its ordinary life-functions, and it would certainly be a logical conclusion to arrive at, that *Pisa Gibbsii* is a species in the process of becoming extinct, notwithstanding its comparative immunity from attacks by fishes.

(To be continued.)

ON EUROPEAN BIRDS OBSERVED IN NORTH AMERICA.

BY PERCY E. FREKE.

In the following pages I have endeavoured to bring together the various scattered records of European birds which have occurred in North America, and which are, properly speaking, not natives of that continent. I have treated as "European birds" all species which are found in Europe, either as natives or as accidental stragglers from neighbouring countries. It is not without much hesitation that I have included these accidental stragglers, but the difficulty of determining which should be considered natives and which foreigners has decided me on including them all, distinguishing by an asterisk those species which Mr. Dresser has excluded from his list of the Birds of Europe.

Unfortunately the difficulty of determining which might fairly be considered as extralimital to the Nearctic region was not so easily solved. On referring to Mr. Ridgway's list in the 'Bulletin of the United States National Museum' for 1881, I find under this designation such species as *Saxicola aenanthe* and *Motacilla flava*, which are known to breed in North America, and which I could not therefore include here. I have therefore omitted from the list the following species, which are sometimes classed as extralimital, as I consider that they properly belong to the North American fauna:—

Saxicola aenanthe.—Breeds in Greenland, Labrador, &c.

Motacilla flava.—Alaska.

Linota hornemannii.—Greenland.

Haliaëtus albicilla.—Greenland.

Anser albifrons.—Greenland.

Ægialitis hiaticula.—Greenland, and west of Cumberland Gulf.

Tringa alpina.—Probably in Greenland, and certainly on the Melville peninsula and elsewhere in Davis' Straits.

The occurrence of *Phaethon aethereus*† in Norway, as reported by MM. Degland and Gerbe, in their 'Ornithologie Européenne' (vol. ii. p. 363), must be considered more than doubtful, and I have omitted it; though it must not be forgotten that Leigh, in his 'Natural History of Lancashire, Cheshire, and the Peak,'

* Once observed in the Nearctic region.

published in 1630, described and figured a "Tropical Bird" which was obtained in England more than 250 years ago, and was in all probability of this species; and Naumann ('Rhea,' i. p. 25) recorded the occurrence of a bird of the genus at Heligoland in or before 1816.

Cygnus bewicki is given by Swainson and Richardson (Faun. Bor. Am., part ii., 1831, p. 465) as breeding in North America upon the sea coast within the Arctic circle, and wintering—according to Lewis and Clarke—near the mouth of the Columbia river. The birds referred to were probably only small specimens of what is now known as *C. americanus*, which was only recognised as a species (Sharpless-Doughty's Cat. N. H., 1830) the year before the date of the 'Fauna Boreali Americana.' Mr. Ridgway, however, considers the evidence sufficient to warrant him in retaining *C. bewicki* on the American list (Bull. U.S. Nat. Museum, 1881, No. 587).

In this paper will be found several species which have only occurred in North America on the Pacific coast, and which could by no possibility be supposed to have crossed over from Europe, but have probably come from the eastern side of the Palearctic region, except the last two in the following list, which are birds of the ocean. They are—

1. <i>Charadrius fulvus</i>	6. <i>Ægialitis curonicus</i>
2. <i>Parus cinctus</i>	7. <i>Cyanecula suecica</i>
3. <i>Phylloscopus borealis</i>	8. <i>Larus cachinnans</i>
4. <i>Syrnium lapponicum</i>	9. <i>Daption capensis</i>
5. <i>Surnia ulula.</i>	10. <i>Diomedea chlororhyncha.</i>

As, however, these ten species belong to the European list, I have retained them here.

Daption capensis I have included on the strength of Degland and Gerbe's record that a bird of this species was shot near Hyères, on the Mediterranean coast of France, in October, 1844. M. de Draguignan, who was its first possessor, gave it to the Natural History collection of Marseilles, where it is stated to be still preserved. They also mention the capture of two other specimens about 1825 (c.f. M. J. Verreaux) on the Seine near Bercy ('Ornithologie Européenne,' vol. ii. p. 373).

The same authors, in treating of *Diomedea chlororhyncha*, state that, according to a note of M. E. Esmark in the 'Nyt. Magazin

for *Naturvidensk.* 1838, two specimens of this species were killed near Kongsberg, in Norway, in April, 1837; and the editors of the 'Analyst,' Messrs. Hall and Neville Wood state (vi. p. 160) that one was killed on the Trent, near Gainsborough, in November, 1836.

Of those species which I have retained, some will, I believe, eventually be found breeding regularly in North America, and will be included in its fauna.

The total number of species which I have included in this paper is fifty-six. Nine of these I have regarded as artificially introduced, and although I consider that as European birds in North America they are entitled to a place here, yet I have distinguished them by a different type from those which have probably wandered to America of their own accord.

Of the remaining forty-seven species ten have appeared on the Pacific coast only, leaving thirty-seven as the number that may be regarded as having probably come from the European side of the Atlantic, whereas Mr. Dalgleish has been able to report sixty-seven species of American visitors to Europe in a note to his paper on that subject (Bull. Nutt. Orn. Club, January, 1881, vol. vi. p. 64).

If we divide the forty-seven species which have wandered to North America into the convenient arrangement of Land Birds, Waders, and Swimmers, we find them distributed in the following manner:—

	Total number of species.	Eastern United States.	North only.	Greenland only.	Pacific coast only.
Land Birds	13	1	12	6	5
Waders	17	5	10	8	1
Swimmers	17	6	9	6	3
	—	—	—	—	—
	47	12	31	20	9

Including one Wader in Nova Scotia and one Swimmer in Barbadoes.

It will be seen from the foregoing table that of the thirteen species of land birds that have been found on the continent twelve have occurred in the northern part only (*i. e.*, Greenland, Labrador, Alaska, &c.), and the single species which is reported from the United States (*Buteo vulgaris* from Michigan) is rather a doubtful record.

The following is a list of species which have from time to time been recorded as occurring in North America, but which records are now considered *erroneous* :—

Alauda calandra (Linn.), Swainson and Richardson, Faun. Bor. Am. (Birds), p. 244. A specimen was stated to be in the British Museum from Hudson's Bay (!), but my friend Mr. Sharpe tells me that he knows nothing of it. It has been reported by Wilson as American on the faith of a dealer.

Strix aluco (Linn.), Nuttall, Manual, i. p. 135. Newfoundland and Hudson's Bay.

Strix passerina (Linn.), Audubon, Birds of Am., i. p. 116. Pieton, Nova Scotia.

Tringa platyrhyncha (Temm.), Nuttall, Manual, ii. p. 114. Arctic America, *fide* Temminck and Bonaparte.

Tringa minuta (Linn.), Swainson and Richardson, Faun. Bor. Am., ii. p. 385. Abundant on flats at the mouth of Nelson and Hayes river. Specimen from Hudson's Bay in the British Museum.

Tringa temminckii (Leisl.), Nuttall, Manual, ii. p. 119. Arctic America.

Totanus calidris (Linn.), Swainson and Richardson, Faun. Bor. Am. Hudson's Bay.

Anser segetum (Gmel.), Nuttall, Manual, ii. p. 348. Canada and Hudson's Bay.

Œdemia nigra (Linn.), Nuttall, *l. c.* p. 423. Coast of the United States.

Mergus albellus (Linn.), Wilson, Am. Orn., iii. pl. lxxi, fig. 4. New England and New York. Nuttall, Manual, ii. p. 467. Audubon, Orn. Biog., iv. p. 350; Birds of Am., vi., 1843, p. 408, pl. 114. Lake Barataria, near New Orleans.

Phalacrocorax graculus (Linn.), Nuttall, Manual, ii. p. 484. South Greenland; United States in winter.

Phalacrocorax pygmaeus (Pall.), Nuttall, *l. c.*, p. 487. Northern North America, *fide* Bonaparte.

Phalacrocorax africanus (Gmel.), Nuttall, *l. c.*, p. 488. United States, *fide* Audubon.

Larus fuscus (Linn.), Nuttall, *l. c.*, p. 302. Greenland, Newfoundland, and Hudson's Bay.

Larus marinus (Pall.), Swainson and Richardson, Faun. Bor. Am., ii. p. 426. A specimen taken in Sir J. Franklin's first Expedition. Nuttall, Manual, ii. p. 289. Baird, Cassin, and Lawrence, Birds of N. Am., p. 853, where it is given with a query. Baird, Cat. 1859, No. 671.

Diomedea exulans (Linn.), Nuttall, Manual, ii. p. 340. Coast of United States. Baird, Cassin, and Lawrence, Birds of N. Am., p. 821.

Podiceps cristatus (Linn.), Swainson and Richardson, Faun. Bor. Am., ii., 1831, p. 410, where a description is given of a specimen killed on the

Saskatchewan. Nuttall, Manual, ii. p. 250. Atlantic States from Nova Scotia southward: Texas in winter: fur countries on Pacific side, Washington Territory. Baird, Cassin, and Lawrence, Birds of N. Am., p. 893: Baird, Cat. 1859, No. 703.

Podiceps minor (Linn.), Nuttall, Manual, ii. 257. Hudson's Bay.

We come then to those species of European birds, which I consider have good claims to be regarded as occasional visitors to North America.

1. *Turdus iliacus* (Linn.). Redwing.—One was sent from Greenland to Dr. Paulsen in 1845. One was shot at Fredericks-haab, South Greenland, October 20th, 1845 (Reinhardt, 'Ibis,' 1861).

2. *Cyanecula suecica* (Linn.). Blue-throated Warbler.—Seven were seen and one obtained June 5, 1851, at St. Michael's, Alaska (Adams, 'Ibis,' 1878, p. 422).

3. *Phylloscopus borealis* (Blas.). Eversmann's Warbler.—One was obtained by Mr. Pease at St. Michael's Island, Norton Sound, Alaska, Aug. 16th, 1866 (Baird, Trans. Chicago Acad., 1869, i. p. 313; Baird, Brewer and Ridgway, Hist. N. Am. Birds, vol. i. p. 71).

4. *Parus cinctus* (Bodd.). Scandinavian Tit.—Several specimens were obtained March 15, 1875, by Mr. L. M. Turner, at St. Michael's, Alaska, where it was found to be not rare (Ridgway, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 37).

5. *Motacilla alba* (Linn.). White Wagtail.—One was sent from the Southern Inspectorate of Greenland in 1849 (Reinhardt, 'Ibis,' 1861). One was obtained at Godhavn, North Greenland, by Dr. Walker, in July, 1857 (Walker, 'Ibis,' 1860); but I do not see this species mentioned in Dr. Walker's list, which was published in the Journ. Roy. Dubl. Soc., vol. iii., 1860, p. 61; where, however, he says, "I shall only enumerate *some* of the different species," &c.

6. *Anthus pratensis* (Linn.). Titlark.—One was sent to Dr. Paulsen from Greenland in the autumn of 1844 (Reinhardt, *in lit.*). 1845 is the date given in Prof. Reinhardt's paper in the 'Ibis' of 1861. One was obtained by Mr. W. H. Dall at St. Michael's, Alaska, and is now in the collection of the United States National Museum (Baird, Brewer, and Ridgway, Hist. N. Am. B., vol. i., p. 173).

[*Carduelis elegans* (Steph.), Goldfinch.—Commonly imported as a cage-bird, and specimens, which have probably escaped from confinement, have not unfrequently been taken in Massachusetts (J. A. Allen, Bull. Nutt. Orn. Club, vol. v. p. 120). Mr. Allen saw one at Cambridge, Massachusetts, Feb. 28, 1865 (J. A. Allen, Am. Nat., vol. iii., p. 635). It has occurred near Boston, Massachusetts (Brewer, Proc. Bost. Soc. N. Hist., xx., 1879, p. 271).]

[*Serinus meridionalis* (Brehm.), Serin Finch.—One was taken at Springfield, Massachusetts, in November (J. A. Allen, Am. Nat., iii., p. 635).]

[*Ligurinus chloris* (Linn.), Greenfinch.—A male of this species was taken March 19th, 1878, at Lowville, Lewis County, New York (R. B. Hough, Bull. Nutt. Orn. Club, vol. v., p. 119). This was also probably an escaped bird.]

[*Passer domesticus* (Linn.), House Sparrow.—First introduced into North America at Portland, Maine, in 1858 (Baird, Brewer, and Ridgway, Hist. N. Am. B., vol. i. p. 526). It has overrun the entire eastern province from the Atlantic coast to the Missouri, and south nearly or quite to the Gulf, but it is most abundant in the Northern States. It is equally abundant in the Missouri Valley and in the Atlantic States, but is, of course, more so in some localities than in others. Apparently not yet introduced into California or other parts of the West (Ridgway, *in lit.*). In the vicinity of all the larger cities, *Passer domesticus* far outnumbers all the native birds taken collectively. It is common also at Salt Lake City, Utah, and at St. Louis, Missouri (Allen, *in lit.*). I have found it abundant in all the cities of the East, from Montreal, Canada, to Richmond, Virginia; but it does not seem to spread much into the surrounding country. Said to have been established in the Bahama Islands, but Mr. Corry says that he has not seen it there ('Birds of the Bahama Islands,' p. 89).]

[*Passer montanus* (Linn.), Tree Sparrow.—Naturalised at St. Louis, Missouri, previous to the introduction there of *P. domesticus*, an interesting account of which is given by Mr. Widman (Bull. Nutt. Orn. Club, vol. v. p. 191). As yet reported only from the immediate vicinity of St. Louis (Ridgway and Allen, *in lit.*).]

[*Alauda arvensis* (Linn.), Sky Lark.—Introduced and apparently established in several localities, as on Long Island, and the vicinity of Cincinnati (Ridgway, *in lit.*). One was shot, June 12, 1850, on the north shore of Hamilton, Bermuda, by Mr. Hurdis (Jones, 'Naturalist in Bermuda,' p. 30). Probably this was an escaped bird. Note.—Mr. Dresser, in his 'Birds of Europe,' says it occasionally visits Greenland, but Professor Reinhardt tells me, "I never heard of any instance at all, and I do not know on what authority the bird is said to be an 'occasional visitor. I suppose an error.'"]

7. *Sturnus vulgaris* (Linn.), Starling.—One was sent from Greenland by Hölboll to the Royal Museum, Copenhagen in 1851 (Reinhardt, 'Ibis,' 1861).

[*Corvus frugilegus* (Linn.), Rook.—Mr. Ridgway saw a specimen of this bird, apparently lately escaped from confinement, perched on a maple tree in the grounds of the Agricultural Department at Washington, D.C., in August, 1879 (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 84).]

8. *Syrnium lapponicum* (Rets.), Lapp Owl.—One was taken at the Yukon delta, Alaska, April 15, 1876, by Mr. L. M. Turner (Ridgway, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 37).

9. *Surnia ulula* (Linn.), Hawk Owl.—Obtained by Mr. Turner at St. Michael's, Alaska, in October, 1876 (Ridgway, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 38).

10. *Buteo vulgaris* (Leach), Buzzard.—One is said to have been taken at Pau Pau, Michigan, by Mr. J. D. Allen, about the beginning of October, 1873 (J. C. Maynard, Bull. Nutt. Orn. Club, vol. i., 1876, p. 2; Ridgway, *l. c.*, p. 32).

11. *Falco gyrfalco* (Linn.), Jerfalcon.—With regard to specimens which might be considered European examples of this bird or its variety *islandus* occurring in North America, I can find no satisfactory evidence. Mr. Ridgway informs me that "no reference can be relied on, all records of *islandus* from the U. S. applying to either *sacer*† or the dark Labrador form *obsoletus*, Gm. I have seen Arctic specimens, however, that could not be distinguished from Iceland specimens; also others that can be perfectly matched by Scandinavian skins (true *gyrfalco*). In fact, '*sacer*' is a form intermediate between *gyrfalco* and *islandus*, some examples being indistinguishable" (Ridgway, *in lit.*). Prof. Reinhardt includes the Iceland form in his list of Greenland birds ('Ibis,' 1861).

12. *Falco æsalon* (Tunstall), Merlin.—A specimen was caught at sea near Greenland, lat. $57^{\circ} 41'$ N., long. $35^{\circ} 23'$ W., in May, 1867, by Mr. E. Whymper, and presented by him to the Norfolk and Norwich Museum (Newton, *Man. Instr. Arct. Exp.*, 1875, p. 96).

† Mr. Ridgway here refers, not to *Falco sacer* (Gmel.), the Saker Falcon of the Old World, but to a variety of *F. gyrfalco*, which he calls *Hierofalco gyrfalco sacer* (Forst.), Ridgway,—McFarlane's Gyrfalcon,—found in the interior of Continental Arctic America.

13. *Falco tinnunculus* (Linn.), Kestrel.—One is said to have flown on board ship, off Cape Farewell, Greenland, on Parry's first return voyage, and been killed (Sabine, *Suppl. Appl.*, p. cex; Newton, *Man. Instr. Arct. Exp.*, 1875, p. 96).

14. *Ardea cinerea* (Linn.), Heron.—A young bird was found dead near Nenortalie, Greenland, in the year 1856, and was sent to Copenhagen (Reinhardt, 'Ibis,' 1861). On Aug. 27th, 1765, the missionary Matthæus Stach saw a Heron in Greenland, which has been reported as of this species (Cranz, 'Fortsetzung der Historie von Grönland,' p. 214; Reinhardt, 'Ibis,' 1861).

15. *Bernicla leucopsis* (Bechst.), Bernicle Goose.—One was obtained by Mr. B. R. Ross, near Rupert House, James' Bay, Hudson's Bay (Baird, *Am. Nat.*, 1868, p. 49). One was obtained at Currituck Sound, North Carolina, Oct. 31st, 1870 (Lawrence, *Am. Nat.*, vol. v. p. 10; Ruthven Deane, *Bull. Nutt. Orn. Club*, vol. ii, 1877, p. 18, foot-note). One was killed at Jamaica Bay, Long Island, Oct. 18th, 1876 (Lawrence, *Bull. Nutt. Orn. Club*, vol. ii., 1877, p. 18). This specimen is now in the U. S. National Museum, No. 80015 (Ridgway, *in lit.*). One is reported from La Salle County, Illinois? ('Forest and Stream,' Nov. 23rd, 1876). According to Hölboll, it is a regular autumn visitor to Julianehaab, Greenland (Reinhardt, 'Ibis,' 1861). Recorded by Graah from the east coast of Greenland (Newton, *Man. Instr. Arct. Exp.*, p. 112).

*[*Chenalopex aegyptiaca* (Gmel.), Egyptian Goose.—One was taken near Carnarsie, Long Island, Jan. 3rd, 1877 (Akhurst, *Bull. Nutt. Orn. Club*, vol. ii., 1877, p. 52). Although having "every appearance of being a wild bird," this specimen had probably escaped from confinement.]

16. *Cygnus musicus* (Bechst.), Whooper Swan.—According to the Esquimaux it used to breed in Greenland long ago.† Two specimens were sent from South Greenland in 1852, and one was shot at Atamik, ten Danish miles north of Godthaab, June 1st, 1859. Some others were observed at Julianehaab in 1846 (Reinhardt, 'Ibis,' 1861).

17. *Querquedula creeca* (Linn.), Teal.—In his paper on "Birds of New England," published in the *Proc. Essex Inst.*, Dr. Coues says it has been "so often taken on the coast as to be fairly considered as more than an accidental visitor" (*Proc. Essex Inst.*,

† Were these birds of this species?

vol. v. No. viii., 1867, p. 298). I have, however, been unable to find definite records of more than a few captures of this species in North America, and I believe its occurrence on the coast is very uncommon. Dr. Coues informs me that he has a specimen in his possession taken in Labrador in 1860, and reported by him in his "Notes on the Ornithology of Labrador" (Proc. Philadelphia Acad. 1861). One is reported by Dr. Bryant as having been shot in Massachusetts, and he states that he has seen several in New York (Proc. Boston Soc. Nat. Hist., vol. v. p. 195). For this occurrence in Massachusetts see also Dr. Brewer, in the Bull. Nutt. Orn. Club, vol. ii., 1877, p. 46, where it is stated to have been taken in North Carolina, and not in Massachusetts. An adult male and an adult female, both from New York, are in the collection of the U.S. National Museum (Ridgway, *in lit.*). A few have been taken in Greenland (Reinhardt, 'Ibis,' 1861).

18. *Mareca penelope* (Linn.).—Widgeon.—Long Island, N. Y.:—One taken on Long Island was purchased in Fulton Market, New York, in 1842 (De L. Berier, Bull. Nutt. Orn. Club, vol. iv., 1879, p. 190). One, probably from Southampton, Long Island, was purchased in Fulton Market, New York, Jan. 6, 1873 (N. T. Lawrence, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 98). Virginia:—Two specimens seen by Dr. Bryant in Quiney Market (Boston, Mass.) from Virginia. He also exhibited a specimen obtained in the market and brought from Philadelphia, and he stated that he had seen two in New York (Proc. Boston Soc. Nat. Hist., vol. v., p. 195; from report of proceedings held April 18th, 1855). One was taken on the coast of Virginia in 1855, and is in the collection of Mr. G. W. Lawrence (N. T. Lawrence, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 98, where Mr. Lawrence says this capture has not been previously recorded). North Carolina:—One, a male, was taken at Currituck, about Dec. 17th, 1878 (De L. Berier, *l. c.*, vol. iv., 1879, p. 190). One was killed at the same place as the above, Jan. 17th, 1879, and is in the possession of Mr. Wm. Bayles, of Brooklyn (De L. Berier, *l. c.*, vol. iv., 1879, p. 190). One, a male, was shot at Currituck in December, 1879, and one or more is received from this locality every winter (Ruthven Deane, *l. c.*, vol. v., 1880, p. 126). Greenland:—A young male was sent from thence to the Royal Museum, Copenhagen, in 1851, and two others also from South Greenland (Reinhardt, 'Ibis,' 1861). The two birds alluded to above, both young males,

were obtained, one in 1852 and the other in 1853 (Reinhardt, *in lit.*). It is "a rather common species in the Aleutians and other parts of Alaska" (Ridgway, *in lit.*). Found south as far as San Francisco (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 77).

19. *Fuligula rufina* (Pall.), Red-crested Pochard.—There is "a young male from New York Market in the [U.S.] Nat. Mus. Coll., collected in the fall of 1871?", the specimen being a young bird just beginning to assume the adult livery" (Ridgway, *in lit.*).†

20. *Ædemia fusca* (Linn.), Velvet Scoter.—"A beautiful male was obtained at Godthaab (South Greenland) in May, 1878, and presented to our Museum" (Reinhardt, *in lit.*; Reinhardt, Vid. Medd. Nat. För. Kjobenhavn, 1879, p. 1).

[*Coturnix communis* (Bonnat.), Quail.—It has been introduced into various localities in the Eastern United States, and now partially naturalized (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 84).]

21. *Porzana maruetta* (Leach), Spotted Crake.—One was obtained near Godthaab, Greenland, Sept. 28th, 1841. One taken at Nenortalik, Greenland, was sent to the Royal Museum, Copenhagen, in 1856 (Reinhardt, 'Ibis,' 1861).

22. *Crex pratensis* (Bechst.), Corn Crake.—It has been taken in New Jersey (Cassin, Proc. Philadelphia Acad., vii., 1855, p. 265; Baird, Am. Jour. Sci. & Arts, 1866, pp. 338, 339). One, an adult male, was taken at Godthaab, Greenland, and sent to the Royal Museum, Copenhagen, in 1851 (Reinhardt, 'Ibis,' 1861). One was shot in Bermuda, Oct. 25th, 1847 (Wedderburn, Zool. 1849, p. 2591).

23. *Fulica atra* (Linn.), Coot.—The Royal Museum, Copenhagen, "received a beautiful specimen from Greenland in 1876" (Reinhardt, *in lit.*).

24. *Charadrius pluvialis* (Linn.), Golden Plover.—One was shot on the Noursoak peninsula, in summer plumage, Greenland, in the spring of 1871, and Dr. Finch thinks it may perhaps breed in Greenland (Newton, Man. Instr. Arct. Exp. 1875, p. 100). Dr. Walker states that he obtained it at Godhavn, North Greenland, in July, 1857, and also at Port Kennedy, Bellot Straits, lat. 72° 11' N. long. 94° W. in the winter of 1858-9 ('Ibis,' 1860, p. 166).

† Supposed to have been shot on Long Island Sound (Ridgway, Proc. U.S. Nat. Mus., April 13th, 1881, pp. 22-24; J. A. A., Bull. Nutt. Orn. Club, vol. vi., p. 173).

25. *Charadrius fulvus* (Gmel.), Eastern Golden Plover.—Taken on St. Paul's Island, Prybilov Islands, Alaska, by Mr. H. W. Elliot, May 2nd, 1873 (Elliot's 'Prybilov Islands'; Coues, 'Birds of the North West,' p. 450, foot-note).

26. *Aegialitis curonica* (Gmel.), Little Ringed Plover.—Described from San Francisco, California, as *Æ. microrhyncha*, Ridgway, N. S. Am. Nat., viii., Feb. 1874, p. 109 (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 67). But Mr. Ridgway added with caution that "it is extremely doubtful whether the specimen was really obtained near San Francisco, as stated on the label."

27. *Vanellus cristatus* (Meyer), Lapwing.—One, a male, was obtained near Fiskenæsset, South Greenland, Jan. 7th, 1820, and sent to the Royal Museum, Copenhagen. One was received from Julianehaab, Greenland, in 1847 (Reinhardt, 'Ibis,' 1861).

28. *Hæmatopus ostralegus* (Linn.), Oystercatcher.—Three examples have been sent from Greenland, one of which was from Julianehaab, in 1847, one from Godthaab in 1851,—both in the Royal Museum, Copenhagen,—and one from Nenortalik in 1859 (Reinhardt, 'Ibis,' 1861).

29. *Scolopax rusticola* (Linn.), Woodcock.—It has been taken in Virginia (Coues, Am. Nat., x., June, 1876, p. 272). Two have occurred in New Jersey, and one in Newfoundland (cf. Lawrence, Ann. N. Y. Lyc. Nat. Hist., viii. pp. 292, 293; Baird, Am. Jour. Arts and Sci., 1866, pp. 338, 339).

30. *Gallinago media* (Leach), Snipe.—Prof. Reinhardt ('Ibis,' 1861) states that it is not uncommon in Greenland, and perhaps breeds there. He tells me that several specimens have been obtained, one in the autumn of 1845 (Reinhardt, *in lit.*).

31. *Tringa subarquata* (Güld.), Curlew Sandpiper.—Massachusetts:—One at Cape Ann, 1865 (Samuels, Orn. and Öl. New Engl., 1868, p. 447). One taken at Nahant beach about 1869 (Ruthven Deane, Bull. Nutt. Orn. Club, vol. iv., 1879, p. 124). One at Ipswich, 1875 (Brewer, Proc. Boston Soc. Nat. Hist., xvii. p. 446). One at East Boston, May, 1876 (Brewster, *l. c.*, vol. i., 1876, p. 51). One at Cape Cod, May, 1878 (Ruthven Deane, *l. c.*, vol. iv., 1879, p. 124). Maine:—"Not very plenty" (Broadman, Proc. Boston Soc. N.H., ix., 1862, p. 128). New Jersey:—At Egg Harbour, "occasionally shot" (Turnbull, Birds of E. Penn., 1869, p. 44). Connecticut:—Three distinct records (Merriam, Birds of Conn., 1877, p. 190). Long Island, N. Y.:—Has occurred in

1839 (Merriam, *l.c.*, *cf.* Dr. Ayres). Said to have been found breeding in Greenland [?] (Brewer, Bull. Nutt. Orn. Club, vol. iv., 1879, p. 190). Professor Reinhardt, however, informs me this is "certainly a mistake, the bird has never been obtained in Greenland," &c. (Reinhardt, *in lit.*).

32. *Machetes pugnax* (Linn.), Ruff.—Massachusetts:—One specimen recorded (Ann. Nat., vol. vi., p. 306). One, a young male, taken at Chatham, Mass., Sept. 11th, 1880 ('Forest and Stream,' Oct. 7th, 1880, p. 186). Maine:—A female taken at Upton, in that State, Sept. 8th, 1874 (Brewer, Bull. Nutt. Orn. Club, vol. i., 1876, p. 19). Dr. Coues, quoting Broadman, mentions one or two occurrences at Calais (Proc. Essex Inst., vol. v., 1867). Long Island, N. Y.:—Accidental (Lawrence, Ann. N. Y. Lyceum, N.H.V., 1852, p. 220). Ohio:—A male taken at the Licking Reservoir, about thirty miles east of Columbus (Wheaton, Bull. Nutt. Orn. Club, vol. ii., 1877, p. 83).

33. *Totanus ochropus* (Linn.), Green Sandpiper.—One specimen was received by Mr. Harting, in 1873, in a small collection from Halifax, Nova Scotia (Brewer, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 49).

34. *Totanus glottis* (Linn.), Greenshank.—Audubon obtained three specimens at Sand Key, Florida, May 28th, 1832 (Birds of America, vol. v. p. 321). Inhabits the province of New York [?] (Pennant, 'Arctic Zoology,' vol. ii., Birds, p. 469). Dr. Elliott Coues states (Key, N.A. Birds, p. 259) that "Audubon's specimen is absolutely identical with European ones."

35. *Limosa aegoccephala* (Linn.), Black-tailed Godwit.—Fabricius mentions that he had seen a single specimen from Greenland, and since 1820 one is said to have been obtained at Godthaab, South Greenland, and to have been sent to the Royal Museum, but the specimen is not extant (Reinhardt, 'Ibis,' 1861).

36. *Numenius phaeopus* (Linn.), Whimbrel.—Prof. Reinhardt says that he has seen five or six specimens, received from all parts of Greenland, and that formerly six others were sent from there (Reinhardt, 'Ibis,' 1861). He tells me there were "perhaps more; it is not very rare" (Reinhardt, *in lit.*).

37. *Hydrochelidon hybrida* (Pall.), Whiskered Tern.—One from the Barbadoes is in the British Museum, presented by Sir Robert Stromberg (Howard Saunders, Proc. Zool. Soc., 1876, p. 641).

38. *Hydrochelidon leucoptera* (Meisn. & Schinz.), White-winged Black Tern.—A specimen was taken in Wisconsin, July 5th, 1873, by Mr. Thure Kumlein, and was erroneously recorded as *H. nigra* by Dr. Coues, in 'Birds of the North West,' 1874, p. 709 (Coues, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 141).

39. *Larus canus* (Linn.), Common Gull.—One was taken by Dr. Coues at Henley Harbour, Labrador, Aug. 21st, 1860 (Howard Saunders, Proc. Zool. Soc., 1878, p. 178).

40. *Larus cachinnans* (Pall.), Yellow-legged Herring Gull.—It has occurred at St. Michael's, Alaska (Baird, Trans. Chicago Acad., i., 1869, p. 305).†

41. *Larus affinis* (Reinlh.), Siberian Gull.—Once taken in Greenland (Reinhardt, Vid. Medd. Nat. För. Kjobenhavn, 1853, p. 78). The type specimen.

42. *Puffinus fuliginosus* (Boie.), Grey Shearwater.—A specimen was received from Greenland by Herr Moschler, and it is now in the Leyden Museum (Schlegel, Mus. Pays-Bas, *Procellarie*, p. 24). Prof. Reinhardt informs me that he thinks this specimen may have come from Labrador, and not from Greenland.

43. *Puffinus anglorum* (Temm.), Manx Shearwater.—Occurs from the coast of New Jersey to Labrador, and, according to Audubon, is not uncommon off the coast of Maine during summer (Baird, Cassin, and Lawrence, N. Am. Birds). Of not uncommon occurrence off the coast of New England, chiefly in winter (Coues, Proc. Essex Inst., 1867, vol. v., No. viii., p. 304). Seen off the Banks of Newfoundland (Allen, Bull. Nutt. Orn. Club, vol. iv., p. 128). In spite of the above statements, I have been unable to ascertain a single authentic instance of its capture on the coast of the United States, and I believe its right to be included in that fauna is doubtful. It has occurred in Greenland (Reinhardt, 'Ibis,' 1861).

44. **Diomedea chlororhyncha* (Gmel.), Yellow-billed Albatross.—One was taken at the mouth of the Columbia river (Baird, Cassin, and Lawrence, N. Am. Birds, p. 823).

45. **Daption capensis* (Linn.), Cape Pigeon.—Accidental off the coast of California (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 76).

† Mr. W. Couper, of Montreal, informs me that it "breeds commonly on the north shore of the Gulf of St. Lawrence;" but I think he must refer to some other species.

46. *Thalassidroma bulweri* (Jard.), Bulwer's Petrel.—There is a specimen from Greenland in the Leyden Museum, received from the Moravian missionaries (Schlegel, Mus. Pays-Bas, *Procellariidae*). Prof. Reinhardt informs me that he thinks this specimen may have come from Labrador.

47. *Podiceps auritus* (Linn.), Horned Grebe.—At least three specimens have been received from South Greenland; one from Nenortalik, Nov. 12th, 1828; afterwards two more. (Reinhardt, *in lit.*).

In conclusion, I desire to thank those friends who have helped me in collecting materials for this list. I am especially indebted to the kindness of Mr. Ridgway, of Washington, Mr. Allen, of Cambridge, Mass., Professor Newton, of Cambridge, and Professor Reinhardt, of Copenhagen, who have given me much valuable information and assistance.

THE MOLLUSCA OF THE ISLE OF MAN.

BY THE REV. T. TALBOT.

(President of the Isle of Man Natural History Society.)

A LIST of the Mollusca of the Isle of Man has been prepared with the object of giving approximately complete information of what has been made known to the present time in this department of our insular fauna, and so to suggest a stimulus to further research. It contains the names of 209 species belonging to 103 genera.

This list, which it is proposed to publish in the 'Proceedings' of our Society, is based on Forbes's 'Malacologia Monensis,' a small volume which he published in 1838, and 'The History of the British Mollusea and their Shells,' which he, conjointly with Mr. Hanley, published in four volumes, 1848-1853. The former being of a local, the latter of a general character, it was not to be expected that in this latter work the Isle of Man would be noted as a locality for all the species named in the earlier volume, many of them being of general distribution. Ten years elapsing between the publication of this and the appearance of the first volume of the 'British Mollusea,' this latter work includes several species found in or about the coasts of our island not mentioned in the earlier publication. In the preparation of this list,

therefore, the two works have been carefully compared, and the results are given with a near approach to, if not with absolute, accuracy. I have deemed it well to give an abstract of the two works, so far as they relate to the Mollusca of our island, in parallel columns, devoting two columns to each. As the classification and nomenclature employed in the 'British Mollusca' differ in many points from those of the 'Malacologia Monensis,' and have been much followed by later writers, I have followed them as to the orders, families, genera, and species in this list, those adopted in the earlier work being consequently departed from. For convenience of reference, however, I have added the volume and pages of both works where every species in the list is mentioned.

Several additions to the list of Mollusca have been made since Professor Forbes's time. Mr. Robert Garner, in a paper on "Professor Edward Forbes and his Country," printed in the 'Midland Naturalist' for March and April, 1878, has given, I think, nineteen species as the result of his dredging and other excursions in and about our island. I have inserted these in the list in due order with Mr. Garner's name and his remarks on habitats, &c. Little else is added.

It may be well to call attention to a few of the species claimed for us by Forbes. And first of those of which he says that merely the shell or only a single valve was found. (1) Of the *Pholas cristata* we read in the 'British Mollusca,' "Dead valves are frequently cast ashore on the Isle of Man," and, in the 'Malacologia Monensis,' "Valves are occasionally thrown ashore at Douglas." (2) The *Solecurtus candidus* of the 'British Mollusca' apparently takes the place of the *Solen strigilatus* of the 'Malacologia Monensis,' and in the latter work we are told, "A single valve of the form *b*," i.e., *candida*, "came up in the dredge off the coast of Ballaugh, Sept., 1836." (3) Respecting the *Lutraria elliptica* we read, in the 'Malacologia Monensis,' "Ballaugh (dead valves), Aug., 1837. Port Erin, Mr. Wallace." In the 'British Mollusca' the Isle of Man is given as a locality for this species without further remark. (4) Of the *Cardium aculeatum*, the 'Malacologia Monensis' informs us, "Dead valves sometimes cast on shore at the Point of Ayr, but I have never taken it alive on the Manx coast." And, in the 'British Mollusca,' we read of this species, "It is a remarkably local shell, and we

believed it peculiar to the South Devon coast; it is stated, however, to have been captured also in Dublin Bay and Portmarnock in Ireland, and in the Hebrides and Orkney Islands (Captain Brown), but has evaded all recent researches in those districts. It is rightly a member of the Lusitanian fauna, and extends its range through the Mediterranean, in many parts of which it is as common as it is rare on our coasts." (5) The *Turritella communis* of the 'British Mollusca' is the *Turritella terebra* of the 'Malacologia Monensis,' of which we read, "Frequently cast ashore (though without the animal) on the north coast." (6) The *Natica monilifera* is said, in the 'Malacologia Monensis,' to be "Rare on the Manx shores; south coast at Port Erin;" to which is added the remark, "I have never seen the animal." (7) Of the *Philene aperta* of the 'British Mollusca,' answering to the *Bulla aperta* of the 'Malacologia Monensis,' the habitat given is "In the stomach of a haddock caught off Douglas, Oct., 1837." How far on this evidence (and I am not aware of any other) these seven species can be justly reckoned to belong to the Mollusca of the Isle of Man, I will not decide. Perhaps all do. The evidence, however, suggests search for these particular species in the living state.

All the mollusks above-named were known to malacologists as natives of our British seas before Forbes wrote; but he believed, when he published the 'Malacologia Monensis,' that he had discovered a new British species off the western coast of this island, namely, *Corbula ovata*. He writes against the name in his work, "n. s." ; adding, "From the root of a *Fucus* cast ashore at Ballaugh"; he also describes and figures the shell. *Corbula ovata* is given in the 'British Mollusca' also, but regarded as a doubtful native whether of the coast of Man or other coasts of the British Islands. "Although," we read, "the original describer (E. F.) of this shell took it himself from the root of a *Laminaria* cast ashore at Ballaugh, in the Isle of Man, he prefers leaving it among the doubtful species rather than stamp with the authority of mature deliberation the previous introduction into our fauna of a species which by its presence there would violate the probabilities of geographical distribution. About ten years have now elapsed since the date of its publication (1838) during which period no second example has been discovered; should no further specimens then be procured upon our coast, the finding of the only recorded

one must be attributed to some such incident as the imbedding of the living mollusk in the tangled roots of some *Fucus* clinging to the oysters or cirrhipedes so wont to congregate upon ship timber in a foreign port, and the subsequent detachment of the seaweed either in the process of careening, or perchance by the breaking up of the vessel itself." As I believe no other observer since Forbes wrote has found another specimen on our British coasts, I presume that this specimen must be considered as a waif from a foreign shore.

On two undoubted species of our Mollusca I would make a few remarks before closing this paper. One is *Unio margaritifera*. Forbes writes, in the 'Malacologia Monensis,' "In the Black River; common near Braddan Church. It was formerly much sought after by the inhabitants for the sake of the pearls which it not unfrequently contains." In the 'British Mollusca' we read, "The variety *Royssii* of this *Unio* was formerly much sought for in the river near Braddan, in the Isle of Man, on account of its pearl," and, on the following page, "The streams of the Isle of Man." Mr. Garner, in his 'Holiday Excursions of a Naturalist,' p. 72, on mentioning Kirk Braddan, says:—"We searched the little river for a mile or more, for a variety of the pearl-mussel, *Alasmodon Royssii*, mentioned by Mr. Forbes as found here. I only satisfied myself that it existed by picking up a fragment of a valve." Is this once much-prized bivalve extinct in Man, or fast becoming so? I once, some years ago, searched long in vain for a specimen, and I have not heard of anyone since Professor Forbes finding this bivalve. The other species to which I have alluded is the *Orbicula norvegica* of the 'Malacologia Monensis,' and the *Crania anomala* of the 'British Mollusca.' In the latter work it is called a "curious bivalve," as indeed it is, and is stated to have been "added to the British list by Dr. Fleming, who found it adhering to stones, from deep water in Zetland; since then it has been taken abundantly in several localities, chiefly on the west coast of Scotland." In the 'Malacologia Monensis' Forbes says, "A single specimen dredged at Ballaugh, Oct., 1834." The peculiar interest that attaches to this mollusk is owing to the circumstance that it belongs to a family and class which held a much more important position anciently in the population of the seas than it holds now. It is one of the five existing species of the *Craniidae*, of which thirty-seven species are known in the

fossil state, and which stretches as far back as the age of the Silurian rocks. And it is one of about one hundred existing species of a few families of the *Brachiopoda*, a class of which upwards of 1800 species are known to geologists, and of which by far the greater portion are found in rocks which present to us almost the earliest evidence of life on our planet. I am not aware that any other specimen than that taken by Forbes has been obtained on the coasts of the Isle of Man.

OCCASIONAL NOTES.

CORNISH NAMES OF WILD ANIMALS.—*Apropos* of the note (p. 382) on the former existence of the Bear and Wolf in Cornwall, I give the following list of Cornish names for various wild animals, collected from the Glossaries of Borlase, Polwhele, and others:—Wolf, *Blaidth*; Bear, *Arth*; Fox, *Lawarn*; Wild Boar, *Bora*; Badger, *Brath-kye*; Otter, *Towan*; Wild Cat, *Koitgath* (*i. e.* Wood-eat); Stag, *Caran*; Fallow-deer, *Da*; Buck, *Kidwich*; Roe-deer, *Yorch*; Buck or Goat, *Byk*, *Bocca*, *Boc*; Weasel, *Louennan*, *Codnagwidr* (*i. e.* White-neck); Ferret, *Yengen*; Fitchew, *Milgy*; Hare, *Scovarnoeg* (*i. e.* Long-eared); Rabbit, *Kynin* (Coney). Polwhele says of the Bear (Book i., p. 158) that it continued in the North of England as late as the eighth century; in the South as late as the Conquest.—J. E. HARTING.

RED-DEER FORMERLY IN CO. DONEGAL.—In Thompson's 'Natural History of Ireland' (vol. iv. p. 31), Gough's edition of Camden's 'Britannia' is quoted as authority for the existence of the Red-deer in abundance on the mountains adjacent to Lough Esk, Co. Donegal. This statement is not to be found in the original work of Camden, and is no doubt due to his editor of 1789. From information lately received from my friend the Very Rev. Dean Gwynn, I learn that, when the grandfather of the late Mr. Stewart, of Ards, came to reside there, in 1782, the people there remembered when Red-deer were frequent about Ards. This is a confirmation of Gough's record. In all probability at that period the Red-deer traversed the whole extent of mountain country which lies between these two places, Ards being about thirty-five miles due north of Lough Esk.—H. CHICHESTER HART.

SQUIRREL DESCENDING TO FEED WITH POULTRY.—A neighbour of mine, whose cottage is thickly surrounded with trees, observed a Squirrel, during the severe weather of winter, occasionally stealing food from the troughs set out for the poultry. At first it caused great commotion among the

birds, but latterly they were less uneasy in its presence. Taking an interest in the wild creature, he began to lay out refuse food for it, including bits of ham, which it greedily appropriated. Getting more courageous, it ventured within doors. After a time it got caught in a trap set for rats underneath the bed. Being freed from its irksome position, it was thought that the Squirrel would venture no more within doors. Neither the incident of the trap nor confinement for some time within a cage availed to restore to it its original shyness. With the coming of summer its visits have been less regular, but occasionally it looks in still. May not a habit like this, affecting only one out of many, be looked upon as corresponding to a "sport" in the vegetable world, and shed some light on the subject of the domestication of animals? The Squirrel seems to have been quite a wild one to start with, for there is no one in the district who had been in the habit of keeping one as a pet.—J. SHAW (Dumfriesshire).—*From 'Nature.'*

ARE SEALS BORN BLIND?—To this question I am able to give a very positive answer. On May 23rd, 1868, I purchased of a dealer in Liverpool four adult Seals. One of them proved to be in young, and was consequently placed by herself in a suitable enclosure with a small pond. She soon became quite tame, and fed freely. On June 8th she became restless, and on the following day, about twelve o'clock, she produced a young one, near the edge of the water. It was covered with a rather thick coat of hair, *its eyes very bright and wide open*; it turned and rolled about, divesting itself of the outer covering of hair, which formed a complete mat upon which the young animal lay. For the first hour or two after its birth it was very active, and within three hours after its birth was swimming and diving about in the water like an adult animal. It uttered a low soft "bah," or single call-note, and looked about after its mother and crawled towards her when she came out of the water. The mother would turn upon her side in order to let the young one suck. The young Seal was thirty-two inches long, and weighed twenty pounds at its birth. A notice written by me appeared in the Zoological Society's 'Proceedings,' June, 1868, recording the above facts.—A. D. BARTLETT (Zoological Gardens, Regent's Park).

BIRDS EATING SLUGS.—With reference to the note on birds eating slugs (p. 335), Pheasants certainly do so. I have shot Pheasants in the Holt Forest which have had their crops completely full of a small white slug, and nothing else. But Pheasants are omnivorous. I have killed them in a wild country, far away from arable land, on the borders of Woolmer Forest, with the crop full of the little scale or scab which is found on the under sides of oak-leaves, and with which the ground is sometimes strewed; and again, I once saw a Pheasant shot on Frimley

Ridges, an equally wild country, with the crop a mass of whorts or whortleberries. This was a hen Pheasant, shot in August, mistaken for a Grey Hen, and as she fell the berries bled from her mouth like blood, which attracted our attention to it. I have counted forty-one acorns from the crop of a Pheasant; thirty-nine from a Wood Pigeon. Pheasants also eat the "champignon," as it is called by the country people—a species of fungus.—JOHN W. G. SPICER (Spye Park, Wilts).

RED-WINGED STARLING IN CORNWALL.—I am informed that early in the present month of August a specimen of the Red-winged Starling was shot at the Swanpool, near Falmouth, by Mr. Gill, taxidermist, of that town. My informant states that the bird had been observed in the neighbourhood for nearly a fortnight before it was secured, and that several ineffectual attempts were previously made to shoot it. This appears to be the first time the occurrence of this species has been noted in Cornwall, although it has been met with in several instances in various other counties of England and Scotland. How pleased our lamented friend the late E. H. Rodd would have been at this interesting addition to the avifauna of his county!—J. E. HARTING.

THICK-KNEE ATTACKED BY A HEN.—On the afternoon of August 2nd Mr. Callow, of Northrepps, Norfolk, heard a screaming cry in his stack-yard, and on going thither found that it proceeded from a Thick-knee which was being vigorously attacked and buffeted by a hen that had a brood of chickens in the yard. The Thick-knee allowed Mr. Callow to capture it in his hand, after which its wing was clipped and it was placed in a walled-in garden, where it seems to be doing well. It appears to be an adult bird, and though very thin bears no visible trace of having been wounded. The stack-yard where the Thick-knee was caught is in the neighbourhood of a large heath, and I think that it may have wandered from thence, and have been attacked by the hen under the idea that it was a hawk.—J. H. GURNEY (Northrepps Hall, Norwich).

THE CALL OF THE CUCKOO.—In a letter appearing in 'Nature' (vol. xxii., p. 76), I stated that "All the Cuckoos here intone in a minor key except one, which alone does not flatten the 3rd of the tonic. The key is in all cases precisely D of concert pitch, as proved by a tuning-fork, and the first note is F on the fifth line." This year I find that while the Cuckoos here generally intone in D minor, as above, there is one again that intones in D major, and two others in C major and C. minor respectively. Some that I casually heard in other places in the neighbourhood intoned in D minor.—JOHN BIRMINGHAM (Millbrook, Tuam).—From 'Nature.'

ABNORMAL EGGS OF TREE PIPIT.—On May 30th a man brought me a Tree Pipit's nest containing five eggs no larger than those of a Regulus.

The bird was sitting when the man found the nest, though none of the eggs contained any yolk. Dwarf eggs are of frequent occurrence, but I never before heard of a complete nestfull being found. The shells of these are as hard and smooth as those of a full-sized egg, and the colour and markings particularly handsome.—BRYAN HOOK (Farnham).

MONTAGU'S HARRIER IN KIRKCUDBRIGHTSHIRE.—I have lately had an opportunity of examining, in the shop of Mr. Hastings, taxidermist, Dumfries, a female Montagu's Harrier which was trapped on the estate of Cairnsmore, in the first week of June last. From the state of plumage of the under parts, I have little doubt it had been nesting, and Mr. Hastings concurs in this opinion. I am not aware that this species has been previously recorded from the Stewartry of Kirkcudbright.—ROBERT SERVICE (Maxwelltown, Dumfries, N. B.).

ERRATA.—Zool. p. 331, first line, for "fen" read "few"; thirty-fourth line, for "wheat" read "barley."—J. H. GURNEY, JUN.

RARE FISHES ON THE CORNISH COAST.—On August 5th I received a specimen of the Bogue (Couch, 'British Fishes,' vol. i. p. 225). It was taken in a strong tideway in a trammel set in about fifteen to twenty fathoms of water off Mousehole Island, in Mount's Bay. It is the first specimen of this fish which I have ever seen. I have handed it to Mr. Francis Day, who happens to be staying here at present, and he will describe it better than I can. On August 6th a small specimen of the Torpedo, *Torpedo hebetans*, was taken in the Bay here by a trawler. I also took a Dorse, *Asellus varius*, in my trammel the same day.—THOMAS CORNISH (Penzance).

RARE FISHES ON THE CORNISH COAST.—Among the various fishes I have obtained during the past fortnight at Penzance are the following, which may be worth recording:—

The Bogue, *Box vulgaris*. An example 12 inches in length, captured in a trammel on August 5th, was kindly sent me by Mr. Cornish, to whom my best thanks are due for the assistance he has afforded me in investigating Cornish fishes. The previously recorded British examples are three; one at Falmouth, October, 1843; one at Plymouth, June, 1872; and one at Helford Harbour, March, 1873.

Müller's Topknot, *Rhombus punctatus*, 6½ inches in length, captured in a trammel along with some Thick-lipped Grey Mullets, *Mugil chelo*. When I first saw it the colours were well marked. Its upper surface was of rich chestnut-brown, while a wide black band passed backwards and a little outwards from each eye. Five large rounded black spots were present on the body, and other smaller and irregularly sized ones were irregularly

distributed. Fins brown, with some dark blotches on the dorsal and anal. The fishermen insisted upon its being a young Brill. It would seem to be common in Mount's Bay, Mr. Cornish having obtained forty-eight examples there between 1858 and 1866.

Torpedo, or Cramp-fish, *Torpedo hebetans*. This fish I have reason to believe, is not very uncommon. At the beginning of August Mr. Matthews, while on board of a trawler off Polperro, observed a large one just captured, which the fishermen were about eviscerating (its liver being removed for the oil it contains), and which would have subsequently been thrown overboard. It was saved for my collection. August 6th, one was trawled off Penzance; August 10th, another, in a debilitated condition, was seen making slowly towards the shore in Mount's Bay and secured by means of a boat-hook. During the present month one was taken at St. Ives, and two more have been captured at Mevagissey this season.

Sting Ray, *Trygon pastinaca*. Mr. Cornish has recorded one from Porthcarrow Sands, nine miles from Penzance. On August 10th I received a young example, measuring seven inches across the disc, which had just been taken in Mount's Bay, and about the 1st of the month two more were said to have been secured at St. Ives in a trawler. The Westminster Aquarium, during the last few years, has received several from the south coast, while they are by no means uncommon off the mouth of the Thames.

Along the S.W. coast one of the principal articles of food for the Mackarel, &c., are the numerous young *Clupeidae*, locally known as "Britt," and which generally abound at this period of the year. Although said to be young Herrings, *Clupea harengus*, all that I have examined, and which were received from Falmouth, were young Sprats, *C. sprattus*. The fry of this latter fish is now being captured in enormous numbers at St. Ives as bait for Gurnards, from four to six being used for each hook, the bait being threaded through the eye.—FRANCIS DAY (Kenilworth House, Pittville, Cheltenham).

THRESHER SHARK ON THE CORNISH COAST.—A Thresher Shark, *Charcharius vulpes*, was taken on August 10th, in Whitsand Bay, in the nets of one of our pilchard-driving boats. It measured 9 feet 3 inches in length in a straight line, and 9 ft. 8 in. on the curve, the tail being exactly 5 ft.; from the snout to the first dorsal fin, 2 ft. 2 in.; between the dorsal fins, 15 in.; from the second dorsal fin to the tail, 6½ in.; depth of tail, 12½ in.; from fork to upper part of tail, 8½ in.; from vent to tail, 15 in.; girth round insertion of tail, 14½ in. The fish had been much mutilated before I saw it, so that I was unable to take the girth of any other part. Mouth, 3½ in. from snout; gape of mouth, 5 in. Colour, dark lead on back, white underneath. Pectoral fin, 15½ in. long by 9½ in. wide at base; the

abdominal fins very much smaller; the second dorsal and anal fins very small. As this is the only specimen I have seen here during a residence of more than forty years, it may be worth noting.—STEPHEN CLOOG (Looe).

PILCHARDS ON THE CORNISH COAST.—We are now (July 19th) taking Pilchards in full roe. The milt and roe are both fully developed. These are our first arrivals in any large quantities. About twenty-five years ago the Pilchard used to arrive on this coast in force about the third week in June. The date of their appearance has been gradually getting later, until now we do not see them in force until the third week in July.—THOMAS CORNISH (Penzance).

NOTICES OF NEW BOOKS.

The History of the Squirrel in Great Britain. By J. A. HARVIE BROWN, F.R.S.E., F.Z.S. 8vo, pp. 183, with a Map. Reprinted from the 'Proceedings of the Royal Physical Society of Edinburgh,' vol. v. Edinburgh: M'Farlane and Erskine. 1881.

On the Introduction of the Squirrel into Ireland. By RICHARD M. BARRINGTON, M.A., LL.B. 8vo, pp. 17, with a Map. Reprinted from the 'Scientific Proceedings of the Royal Dublin Society.' Dublin: Thom & Co. 1881.

THE notion of selecting some particular mammal or bird, and treating its life-history and distribution in the British Islands monographically, is a good one, and we should like to see more of this kind of work. In 'The Zoologist' for 1879 (p. 468) we reviewed an important essay of the kind, by Mr. Harvie Brown, "On the Capercaillie in Scotland," and his more recently published articles in this journal on the Rarer Animals of Scotland will be fresh in the minds of our readers. We have now before us a most interesting account of the Squirrel, in which the writer traces its distribution throughout Scotland, and discusses the question whether it is an introduced species or originally indigenous. His researches tend to prove that it was known to, or at least mentioned by, early writers as a native of some parts of Scotland, and had apparently a wide distribution in the pine woods and country north of the Firths of Forth and Clyde; that

it did not become absolutely extinct in Scotland, but lingered in the old forest of Rothiemurcus until resuscitated by the new growth of suitable woods; that it remained in Argyleshire until the year 1839 or 1840, when the last of its race in that part of the country is said to have been killed; and that in Ross-shire it survived in the wooded glen of Ainaig until about the close of the last century.

If ever indigenous to the South of Scotland, says Mr. Harvie Brown, the Squirrel must have disappeared from it at a very early period, advancing northwards to the shelter of the denser forests north of the Firths of Forth and Clyde; and in support of this view he comments on certain local migrations of this little animal which have been observed to take place during severe winters.

As we proceed further north, however, and approach nearer to the southern limits of the old Caledonian forest "circumstances under which we must consider the prior distribution of the Squirrel entirely alter," and Mr. Harvie Brown thinks there can be little doubt that the Squirrel was indigenous to nearly the whole mainland of Scotland north of the Firths of Forth and Clyde. Dealing with each county separately, he brings forward numerous items of information regarding the scarcity or otherwise of this little animal as observed at different dates, and furnishes many interesting particulars concerning its food and habits, and the damage caused to woods and plantations by its destructive propensity for bark and the tender shoots of growing trees. In one forest alone, that of Glen Tanar, in Aberdeenshire, in one year (1874) the Squirrels were said to have destroyed at least 1000 trees, occasioning a loss estimated at £500. In the Cawder plantations, where they were found to be very destructive, as many as 1100 or 1200 have been shot or trapped in a single year; while in seventeen years, between 1862 and 1878, no less than 14,123 were killed, for which, at the rate of threepence and fourpence a head, the sum of £213 odd was paid. These figures will give some idea of the immense amount of damage to plantations such an army of Squirrels would cause.

The statistics which Mr. Harvie Brown has collected on the vexed question whether Squirrels prey on young birds and eggs prove conclusively that they do; not as a habit, however, but as an exception and an acquired taste.

The question whether the Squirrel is a native of Ireland or has been introduced, is dealt with by Mr. Barrington in the essay of which we have given the title above. The doubt which has been expressed on the subject does not appear to be yet quite resolved, but Mr. Barrington adduces strong evidence to prove that the animal is not indigenous, and that its existence in Ireland is due to human agency exercised at no very recent date. Through the kindness of correspondents, he has been enabled to trace the occurrence of the Squirrel in every locality in Ireland where it is known to exist, with great probability to what he terms "local centres of introduction."

In some cases it is possible to follow its course and fix the dates of its occurrence as it advanced from district to district from the local centre. "No circumstances," says Mr. Barrington, "shows with greater force that the Squirrel is no more a native of Ireland than the Mole, the Dormouse, the Voles, and many other mammals common in England, than its present distribution. We are forced to conclude that, like the Frog, it has been introduced; for it is impossible to reconcile the theory of extinction and subsequent reintroduction with the great rapidity of its increase."

Mr. Barrington traces the present distribution of this little rodent from each separate centre of introduction, and, as it seems to us, adduces strong evidence in support of his views above expressed, his case being made all the clearer by the carefully prepared map which accompanies it.

Ostrich Farming in South Africa. By ARTHUR DOUGLASS. Post 8vo, pp. 251, with map and illustrations. London: Cassell, Petter, Galpin & Co., and Silver & Co. 1881.

No matter what form of enterprise a man may embark in, no matter what special line of research may engage his attention, it is almost certain that, through the medium of advertisements and reviews, he must sooner or later be made acquainted with the existence of any modern publication bearing on his *spécialité*, even if he does not actually procure the work, as it is natural to suppose he would do. In 1876 appeared a volume entitled 'Ostriches and Ostrich Farming' (see Zool. 1876, p. 5173), of which a second edition was issued in February, 1879 (Zool.

1879, p. 496), and of which some few hundred copies, as we have reason to believe, were despatched for circulation in South Africa. It is not unreasonable to suppose that a book with such a title would attract the notice of those who, like Mr. Douglass, are financially interested in the success of Ostrich farming. Yet, if we are to credit the statement made in the preface of the volume before us, Mr. Douglass seems never to have heard of it. Numerous letters, he tells us, have been addressed to him from all parts of the world asking if any such book were to be had, and the only inference which the reader of his preface can draw is, that the author was unable to name any such work. On the contrary, the latter claims for his own recently published volume that it is "the first work of its kind ever published." Now, so far from this being the case, it is not the second, nor even the third, of its kind; and it is therefore not a little surprising that a preface, dated London, June, 1881, should contain so pretentious, and, at the same time, so inaccurate a statement. It is true that the second of the three books to which we have referred (that by M. Oudot, published in Paris, 1880), although professing to be original, is a barefaced appropriation of the greater portion of Messrs. Mosenthal and Harting's work, disguised in a French dress, with the addition here and there of what is technically termed "padding," the translator and appropriator having had the effrontery to announce, on his title-page, that the right of translation and reproduction was reserved! A bolder stroke of plagiarism than this we never heard of. But we are not now reviewing this production of M. Oudot, and only refer to it for the purpose of showing that it was published long before Mr. Douglass wrote his preface. So also was an excellent essay by Mr. J. S. Cooke, which appeared last year, and which contains much practical information on the subject of Ostrich farming, personally collected by the author in Cape Colony.

As a writer on this subject, therefore, it is clear that Mr. Douglass has come somewhat late into the field. Had he only made himself acquainted before writing with what previous authors had written on the subject, he would not only have saved himself a considerable amount of trouble, but would have avoided some of the errors into which he has fallen on the subject of the rise and progress of Ostrich farming and the so-called natural history of the bird.

But we must do Mr. Douglass the justice to observe that his remarks on the breeding and rearing of Ostriches, and on the general management of an Ostrich farm, are not only original, but of much practical value. His long personal experience as one of the largest Ostrich farmers in South Africa, and the success which has attended his experiments in designing and perfecting an artificial incubator, certainly qualify him to write with authority on the subject, and we do not doubt that his book will prove of much utility, not only to those who have already established Ostrich farms in the Colony, but to others who, having capital at command, are disposed to invest it in what with good management appears to be a very profitable undertaking.

The Insect Hunter's Companion. By the Rev. JOSEPH GREENE, M.A. Being instructions for collecting and preserving Butterflies, Moths, Beetles, &c. Third edition, revised and extended by A. B. FARN. The chapter on Coleoptera by E. NEWMAN. 12mo, pp. 114. London: Swan Sonnen-schein & Allen.

THE fact of this little manual having reached a third edition renders any word of recommendation from us almost unnecessary. It shows how popular is the pursuit of insect collecting, and how continued is the demand for information on the subject.

We fear, however, that with a good many people there is no other aim but that of making a collection of beautiful or rare natural objects, and that as soon as this is accomplished there is an end of Entomology.

Of those who turn their collections to good account the percentage is probably very small. It is perhaps, therefore, quite as well that Mr. Farn should, in his preface, offer some remarks on this point. "While giving practical details," he says, "of how to rear, capture, and preserve specimens, it must not be thought that the end to be attained by an entomologist is simply the acquisition of a collection. Apart from the pleasure of collecting—a pleasure it would be difficult adequately to describe—it should be borne in mind that this should be a means to an end; and perhaps the grandest end which may be striven

for in the pursuit of Entomology is a knowledge of how to combat those insects which cause incalculable damage to the agriculturist especially, and to mankind generally."

It is to be hoped that these remarks will be taken to heart by young collectors, and that the useful hints which are given for collecting, rearing, setting, and preserving insects, all of which have borne the test of actual experience, will in due course be turned to good account by those for whose benefit they have been detailed.

A Zoological Atlas (including Comparative Anatomy), with practical directions and explanatory text. For the use of Students.

231 coloured figures and diagrams. By D. M'ALPINE, F.C.S., Lecturer on Biology and Natural History, Edinburgh. (*Vertebrata*). Edinburgh and London : W. & A. K. Johnston. 1881.

In most recent works on Biology the authors very properly insist on the necessity for practical work in order to thoroughly understand the subjects, but no attempt hitherto seems to have been made to depict what to see as well as describe how to see it.

In the Atlas before us a series of forms, gradually increasing in complexity, are examined externally and internally, and the results of that examination carefully drawn, so that by a previous study of a plate of any given species the specimen itself is easily understood. The species selected in the present case are the Skate, Cod, Salamander, Tortoise, Pigeon, and Rabbit, all easily procurable forms, and of a convenient size for dissection. We observe that the names of the various parts are placed on the drawing, a very commendable feature ; thus the attention is not distracted by referring to an index, and there is no chance of a mistaken reference ; while the accompanying descriptions in every case very properly face the plates. These seem to have been prepared with great care and accuracy, and, as an aid to teachers, will be found extremely useful. Indeed, with such an Atlas before him, and a good text-book, the student might almost dispense with the services of a professor.
